

REMARKS

Claims 1-14 are pending in the present application. Claims 1 and 14 have been amended as a result of this Response. Claims 1 and 14 are independent claims.

ACKNOWLEDGEMENTS

Applicant acknowledges the Examiner's consideration of Applicant's Preliminary Amendment filed on August 27, 1999, Applicant's claim of Priority filed on August 27, 1999, and Applicant's Information Disclosure Statements filed on August 27, 1999 and April 9, 2003.

DRAWINGS

The Draftsman has objected to the drawings due to minor informalities. Applicants direct the Examiner's attention to the Drawing Correction Approval Request filed concurrently herewith, which includes eight (8) sheets of formal drawings. Withdrawal of this drawing objection in light of the newly submitted formal drawings is respectfully requested.

REJECTION TO THE SPECIFICATION

The Examiner has objected to the specification due to a minor informality on page 4. This minor informality has been corrected and withdrawal of this objection is respectfully requested.

35 U.S.C. §112, SECOND PARAGRAPH REJECTION

Claims 1 and 14 have been rejected under 35 U.S.C. § 112, second paragraph. While Applicant disagrees with the Examiner's argument in this regard, Applicant has amended

independent claims 1 and 14, to remove the specific examples. Applicant respectfully submits that these amendments broaden independent claims 1 and 14, in that, with respect to independent claims 1 and 14, the input data may be a list of polygons or other input data, as currently recited. Similarly, the writing fields defined in independent claims 1 and 14 may be swaths or some other writing field.

In light of the amendments to independent claims 1 and 14, reconsideration and withdrawal of this rejection is respectfully requested.

35 U.S.C. § 102(B) TEITZEL ET AL. REJECTION

Claims 1-14 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 5,533,170. This rejection, insofar as it pertains to the presently pending claims is respectfully traversed for the following reasons.

Independent claims 1 and 14 relate to a method and a system for fast and accurate writing of very complex patterns on a light sensitive surface with several (at least two) beams simultaneously. Conventional problems related to this type of writing applications are e.g. the problem of forwarding the large amount of data needed for controlling and modulating the beams, and the provision of an efficient way to achieve the necessary data processing.

Teitzel does not provide an adequate solution to the above-discussed problems, and does not disclose the same method/system as defined in independent claims 1 and 14.

Teitzel, which is briefly discussed in the background section of the specification, discloses a high-throughput multibeam data path based on parallel rasterizers. Each rasterizer converts a frame of the pattern to a pixel map where each pixel has a greyscale value from 0 to 16. The

bitmaps are distributed to beam boards via a bus system and loaded into a buffer RAM area in each bus board.

The Teitzel solution requires high processing power. In particular, every pixel has to be filled with its proper value and transmitted to the beam boards for writing. This is done by signal processors and custom ASICs. The writing system has a burst pixel rate of 1600 million pixels per second, and high demand are placed on the internal data paths. Therefore, a system with parallel buses is used, and the result is complex, costly and/or inflexible.

In Teitzel, a host computer 501 receives geometric data representing the pattern to be written (see e.g. col. 6, lines 47-50). The host computer divides the geometrical data into subframes to be sent to "geometry engines" 504-511; one sub-frame for each geometry engine (see e.g. col. 7, lines 35-41).

Several geometry engines are working in parallel, and a preferred number of 24 is mentioned. The geometry engines translate the geometry description into a gray scale pixel map of a sub-frame. Each pixel value represents the desired beam intensity at the corresponding location (see e.g. col. 7, lines 8-11). Accordingly, the geometry engines performs a rasterization of the geometrical data, into a sampled pixel map, where each pixel value represents an intensity for the corresponding position (see e.g. col. 8, lines 54-62 and col. 9, lines 39-40 and 60-62).

The pixel data representation thus created is then forwarded to beam boards, and thereafter used for modulation of the plurality of writing beams. However, the beam boards do not convert or manipulate the data received, but merely functions as a buffer for storing the data until it is needed (see e.g. col. 11, lines 30-41).

In exemplary embodiments, the present invention involves a separate beam processor unit for each beam. Each beam processor may include data conversion logic and a laser beam

modulator. The data conversion performed by the data conversion logic may be divided in two steps: first, cutting the geometries into scan lines and simplifying them, and then finishing the conversion of the scan lines at the points of demand, i.e. in the beam processors in the driving electronics for each beam. In exemplary embodiments, more of the conversion is performed at a later point, i.e. at the beams. In exemplary embodiments, at an earlier stage data is separated for the different beams and distributed, and the data is simplified so the beam processors can handle the data flow. This is discussed in more detail in the "Summary of the Invention" part of the specification.

Accordingly, there is at least one difference between the invention as defined in independent claims 1 and 14 and Teitzel. In particular, Teitzel involves one division of the original data into smaller pieces, namely the division into sub-frames as performed in the host computer. On the contrary, independent claims 1 and 14 involves a first conversion in which the input data is fractured into writing fields and a second conversion in which the geometries are cut into scan lines.

Teitzel fails to teach or suggest this feature. Accordingly, Applicant respectfully submits that independent claims 1 and 14 are allowable for at least this reason. Further, Applicant respectfully submits that dependent claims 2-13 are allowable by virtue of their dependency on allowable independent claim 1, for at least the reasons set forth above.

CONCLUSION

Accordingly, in view of the above amendments and remarks, reconsideration of the objections and rejections and allowance of each of claims 1-14 in connection with the present application is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John A. Castellano at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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By


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